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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,955	11/13/2001	Sten Lindau	19391.0028	6525
26694	7590	12/02/2004	EXAMINER	
VENABLE, BAETJER, HOWARD AND CIVILETTI, LLP			LEE, SHUN K	
P.O. BOX 34385				
WASHINGTON, DC 20043-9998			ART UNIT	PAPER NUMBER
			2878	

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/914,955	Applicant(s) LINDAU, STEN	
	Examiner Shun Lee	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2004.  
2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 11-24 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 11-24 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 13 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \*    c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 15-17 and 23 are objected to because of the following informalities:
  - (a) in claim 15, "a central part" on line 2 should probably be --said central part-- (see "a central part" on line 5 in claim 11);
  - (b) in claim 16, "an interval of the grating elements" on lines 1-2 should probably be --said grating interval-- since there is insufficient antecedent basis for "the grating elements" (see "a grating interval" on line 5 in claim 11);
  - (c) in claim 17, "an interval of the grating elements" on lines 1-2 should probably be --said grating interval-- since there is insufficient antecedent basis for "the grating elements" (see "a grating interval" on line 5 in claim 11);
  - (d) in claim 17, "central parts" on line 2 should probably be --said central part-- (see "a central part" on line 5 in claim 11);
  - (e) in claim 17, "outer parts" on line 2 should probably be --said outer parts-- (see "outer parts" on line 5 in claim 11); and
  - (f) in claim 23, "infrared radiation" on line 1 should probably be --said infrared radiation--.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: x, D, and S to other elements.

4. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites the limitation "where the higher values within both areas are related to each other and the lower values within both areas are related to each other" which is vague and indefinite since the form of the relationship(s) are not particularly pointed out and distinctly claimed.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 11-17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee *et al.* ("Quantum well infrared photodetectors with bi-periodic grating couplers", Appl. Phys. Lett., Vol. 61, no. 20 (16 November 1992), pp. 2437-2439) in view of Morgan (US 5,056,889).

In regard to claims **11-13, 17, and 20**, Lee *et al.* disclose a quantum well based two-dimensional detector (pg. 2437, right column, second paragraph) operative to detect incident infrared radiation upon a detector surface at various angles of incidence in relation to a normal to the surface, the detector comprising: a diffraction grating (pg. 2437, left column, last paragraph) operative to diffract the incident radiation, the diffraction grating having a grating interval that varies from a central part of the detector out towards outer parts of the detector (pg. 2437, left column, last paragraph). While Lee *et al.* also disclose (pg. 2439, left column, first paragraph) that the diffraction grating provides better uniformity across the wafer, the detector of Lee *et al.* lacks that a variation in the grating interval (e.g., varies linearly such as with increasing distance or in steps) at least contributes to retain in the detection diffracted rays of the orders 1 and -1 as active components across the detector surface by changing angle values of the diffracted rays depending upon angles of incidence (e.g., 0-45°) of the radiation falling on the various parts of the detector surface. However, diffraction by a grating is well known in the art. For example, Morgan teaches (column 3, lines 36-42) that the first order (*i.e.*, orders 1 and -1) diffracted beam direction should be parallel to the layer structure and is dependent on both radiation incidence angle and grating period. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to arrange the grating periods in the detector of Lee *et al.* depending on the expected radiation incidence angles, in order that the first order (*i.e.*, orders 1 and -1) diffracted beam direction should be parallel to the layer structure.

In regard to claim **14** which is dependent on claim 11, Lee *et al.* also disclose (pg. 2437, right column, first paragraph) that grating elements incorporated in the diffraction grating vary at least one of the configuration, size, or shape in a horizontal section of the diffraction grating (see also Fig. 3).

In regard to claim **15** which is dependent on claim 14, Lee *et al.* also disclose (Fig. 1) that the grating elements are square at a central part of the detector surface and change to rectangular shapes toward the outer parts of the detector surface.

In regard to claim **16** which is dependent on claim 11, Lee *et al.* also disclose (pg. 2439, left column, first paragraph) that an interval of the grating elements is selected such that a sensitivity of the detector is substantially similar over an entire surface of the detector.

In regard to claim **21** which is dependent on claim 11 in so far as understood, Lee *et al.* also disclose (pg. 2438, right column, last paragraph) that the grating interval has values of e.g., 2.67  $\mu\text{m}$  and 2.95  $\mu\text{m}$  (*i.e.*, approximately 2.5-3.0 micrometers to approximately 3.0-3.5 micrometers).

7. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee *et al.* ("Quantum well infrared photodetectors with bi-periodic grating couplers", Appl. Phys. Lett., Vol. 61, no. 20 (16 November 1992), pp. 2437-2439) in view of Morgan (US 5,056,889), Norton (US 5,373,182), and Applicant's Admitted Prior Art.

In regard to claims **22-24**, Lee *et al.* in view of Morgan is applied as in claims 11-14, 16, 17, 20, and 21 above. The detector of Lee *et al.* lacks that it is packaged as a camera system which further comprises optics, an aperture, and a cooling unit.

However, camera system components are well known in the art. For example, Norton teaches (Fig. 4) that a camera system (40) comprises optics (42), aperture (41, 48), and cooling unit (44). As another example, applicant admits (pg. 5, line 35 to pg. 6, line 15) as Prior Art that a camera system comprises optics, aperture, and cooling unit are known and incorporated in a known way. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to package the detector of Lee *et al.* with optics, aperture, and cooling unit for use as a camera system.

### ***Response to Arguments***

8. Applicant's arguments filed 27 May 2004 have been fully considered but they are not persuasive.

Applicant argues (first two paragraphs on pg. 9 of remarks filed 27 May 2004) that the combination of Lee *et al.* and Morgan suggest a grating arrangement that includes different gratings on different structures and not a single detector having a detection surface that includes a grating surface that varies over the detection surface. Examiner respectfully disagrees. Lee *et al.* teach (Figs. 1 and 3) a single detector (*i.e.*, a QWIP) having a detection surface that includes a grating surface (*i.e.*, a bi-periodic coupler) that varies over the detection surface. Therefore, Applicant's arguments are not persuasive.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Tuesday-Friday.

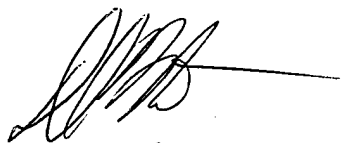
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2878

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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